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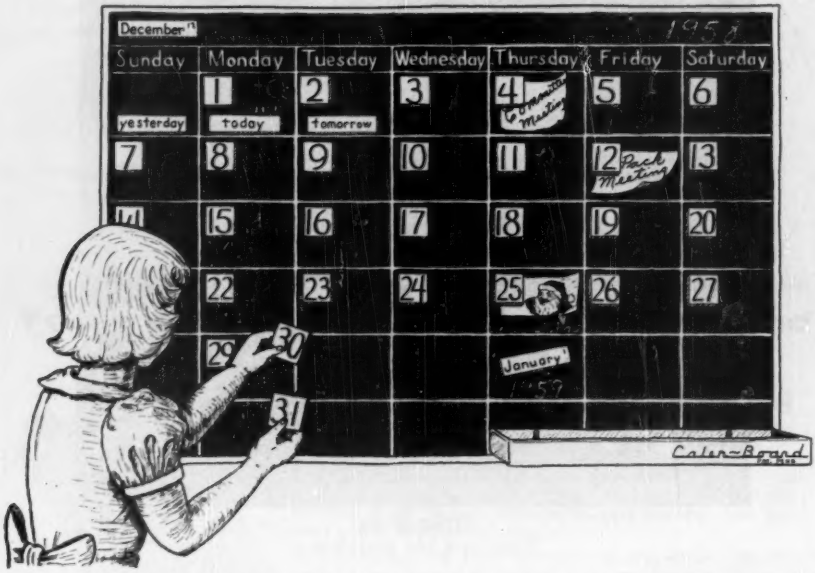

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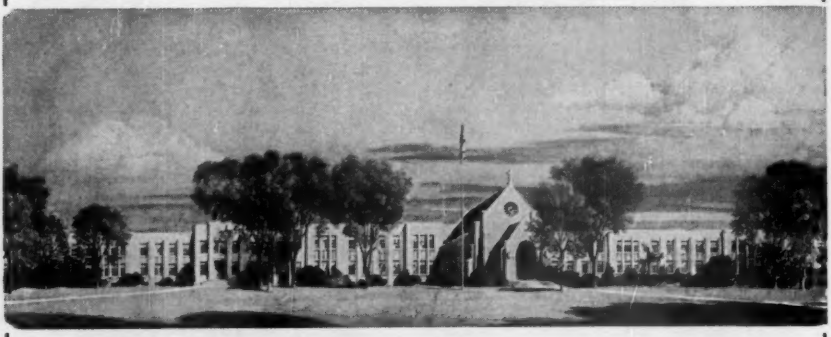

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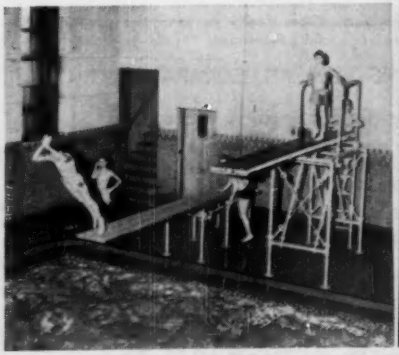

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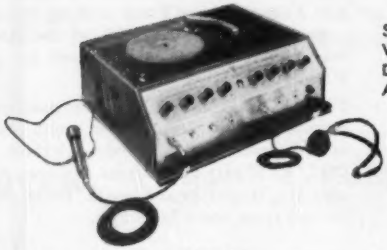

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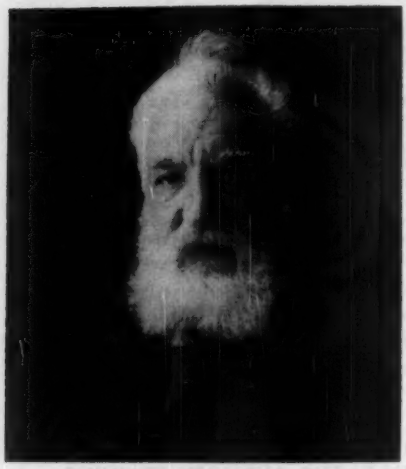

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THE ALEXANDER GRAHAM BELL ASSOCIATION FOR THE DEAF welcomes to its membership all who are interested in improving the education of the deaf and the hard of hearing, their ability to communicate with those who hear normally, and their adjustment to life in the hearing world. Its membership fee ($5 a year—$100 for life) includes a subscription to *The Volta Review*. Those wishing to lend additional support to the work of the Association may become sustaining members for a fee of $10 per year.

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COVER

The sound of a human voice, even imperfectly heard, is a joy to Mike. See page 66.

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PRE-REGISTER Now for the Summer Meeting

June 27-July 1, 1960

FOR the convenience of those attending the 1960 Annual Meeting of the Alexander Graham Bell Association for the Deaf, arrangements have been made for pre-registration. The pre-registration forms will be sent to all Association members and members of affiliate groups some time in March.

In addition to members of the Association and members of affiliate groups, registration for the meeting is open to non-member teachers, parents and others interested in the education of the deaf and hard of hearing.

Registration by mail, prior to the June 26-July 1 meeting, will be an advantage to both members and non-members who plan to attend the Summer Meeting, being held this year in Rochester, N. Y., at the Manger Hotel.

Pre-registration has proved to be time-saving, especially in eliminating last-minute standing in line. All arrangements, except the distribution of the badges, will be taken care of by mail. The badges will be prepared in advance, and will be given out in Rochester upon presentation of registration slips. All those attending the meeting must register, and will be required to show their badges in order to attend the sessions.

Fees for registration are:

Association members and members of Affiliate Groups	**$2.00**
Non-members	**5.00**
New members (includes subscription to the *Volta Review*)	**7.00**
Wife or husband of member	**2.00**

Association members and members of parent affiliate groups will receive pre-registration forms in the mail. Non-members planning to attend the meeting may apply for the forms by writing to the Alexander Graham Bell Association for the Deaf at 1537 35th St., N.W., Washington 7, D. C.

Parents will be particularly interested in the sessions of the Parents' Section of the Association and the full day Parents' Program which has been planned. The Section was formally organized at the 1958 Summer Meeting, at which time Robert Cole, father of two deaf children, was elected president. At the 1960 meeting the Section will meet in special session to elect officers, a 15-man Governing Board, and make plans for future projects.

TEACHING MACHINES for the Deaf

GEORGE A. FALCONER

A CONSTANT challenge to teachers of the deaf is the reduction of the language retardation which deafness imposes upon their pupils. Methods must be revised continuously so that each moment of formal instruction is directed toward closing the gap between the decelerated language growth of the deaf and their more typical development in those forms of maturation that are not related to the function of hearing. By persisting in the effort to increase the efficiency of teaching, this gap will be narrowed. One highly promising procedure for increasing teaching efficiency with the deaf stands ready for introduction. This is the application of appropriate teaching machines.

Currently, there is a surge of interest among theoretical and experimental psychologists in the possibilities of teaching machines. This has come some 30 years after Sidney L. Pressey[1] attempted to stimulate interest in them. He seems to have failed in his efforts because of cultural inertia and certain limitations in the coincident environment of psychological theory, which was concerned more with rate of learning and forgetting than with how learning took place.[2] A renewal of interest in teaching machines has come about in the past few years as a result of B. F. Skinner's efforts to apply knowledge gained in the laboratory by himself and his co-workers through an experimental analysis of events which influence learning. This involved analyzing the effects of reinforcement. By varying the types of consequences resulting from some given behavior, it was noted that the probability of the behavior changes. A conditioning takes place as a result of stimulation by the consequences of the organism's own behavior as it operates upon its physical environment.

Somewhat appalled at the inefficiency of the teaching of arithmetic to elementary school children, Skinner applied his knowledge from the laboratory to the development of a machine for teaching arithmetic. He reasoned that matter to be learned must be broken down into its smallest steps, some 25,000 for four grades of elementary arithmetic. A teacher cannot supply appropriate reinforcements to this many steps under ordinary classroom conditions. Skinner believed that this could be done by means of a teaching machine. He describes his device as follows.[3]

> The device consists of a small box about the size of a small record player. On the top surface is a window through which a question or problem printed on a paper tape may be seen. The child answers the question by moving one or more sliders upon which the digits 0 through 9 are printed. The answer appears in square holes punched in the paper upon which the question is printed. When the answer has been set, the child turns a knob. The operation is as simple as adjusting a television set. If the answer is right, the knob turns freely and can be made to ring a

Dr. Falconer is assistant professor of speech and staff audiologist, Illinois State Normal University, Normal, Ill.

> bell or provide some other conditioned reinforcement. If the answer is wrong, the knob will not turn. A counter may be added to tally wrong answers. The knob must then be reversed slightly and a second attempt at a right answer made. When the answer is right, a further turn of the knob engages a clutch which moves the next problem into place in the window. This movement cannot be completed, however, until the sliders have been returned to zero.

Skinner designed a similar device in which the sliders carry the letters of the alphabet. It can be used to teach spelling.

For more advanced students, Skinner has developed a device which depends upon the student's reading the material instead of arranging numbers or letters.

> . . . material is printed in 30 radial frames on a 12-inch disk. The student inserts the disk and closes the machine. He cannot proceed until the machine has been locked, and, once he has begun, the machine cannot be unlocked. All but a corner of one frame is visible through a window. The student writes his response on a paper strip exposed through a second opening. By lifting a lever on the front of the machine, he moves what he has written under a transparent cover and uncovers the correct response in the remaining corner of the frame. If the two responses correspond, he moves the lever horizontally. This movement punches a hole in the paper opposite his response, recording the fact that he called it correct, and alters the machine so that the frame will not appear again when the student works around the disk a second time. Whether the response was correct or not, a second frame appears when the lever is returned to its starting position. The student proceeds in this way until he has responded to all frames. He then works around the disk a second time, but only those frames appear to which he has not correctly responded. When the disk revolves without stopping, the assignment is finished.[2]

This machine is being used with good results in experimental application at Harvard University.

The success of such a machine, Skinner points out, depends upon the material used in it. Through the machine the student is brought into contact with the person who prepared the material being presented. Skinner compares this relationship with that existing between pupil and private tutor. There is a constant interchange between program and student which does not exist in lectures, textbooks, movies and visual aids. The machine requires that every point be thoroughly understood and presents material for which the student is ready. He takes only those steps for which he is best equipped and likely to take.

Private tutoring via electronics.

It helps the student to come up with the right answer through an orderly construction of the program and by appropriate hints, prompts, and suggestions. The student is reinforced immediately for every correct response, as a private tutor would do, thereby, holding the student's interest. The unobtrusive supervision of learning inherent in the machine keeps the pupil alert and busy at his own rate and at his own level of achievement.

There are apparent advantages in using teaching machines with the deaf. Individual instruction is paramount in the educational procedure with these children. The characteristically small classes found in educational programs for the deaf attest to this. In the small groups, the teacher must frequently focus his attention upon a single child to guide and develop speech, to get across an item of learning, and so forth. The other children sit by inattentively, perhaps, awaiting the continuation of the lesson or, in other situations, awaiting their turns for individual instruction. It is highly desirable to provide the children with self-oriented activities which will fill these unattended periods with profitable learning exercises of a nature theoretically determined to be superior to traditional methods.

Much of the teacher's time, traditionally, is devoted to drill—a dull occupation for the teacher because it is uninspiring and dull to the pupil because it does not hold his interest by constant stimulation and frequent reinforcements. By relieving the teacher of the tedium of repetitive drill, more time could be devoted to the essential needs of deaf children which necessitate those human qualities and special skills possessed by teachers of the deaf.

We are proposing, then, that appropriately designed teaching machines which incorporate properly prepared teaching material will augment the work of teachers of deaf children for the following reasons:

1. Relieve the teacher of time devoted to repetitive drill.
2. Engage the pupils in self-oriented activities that are conducive to learning during periods when the teacher is occupied in teaching other children.
3. Take advantage of certain learning principles that are inherent in appropriate mechanical teaching devices.

There is a philosophic value underlying the principles of positive reinforcement associated with teaching machines which is worthy of consideration, also. A large amount of the learning of deaf children is subject to the personal control of the teacher, who attempts to control learning by various methods common to the classroom, i.e., approval, praise, and the aversive forms of control, disapproval or, even, punishment. It has been observed that the deaf child is exceptionally dependent upon direct supervision by his teachers. Perhaps, with some reduction in supervision and an increased opportunity to work independently through machines, the deaf child would benefit emotionally as well as educationally. There would be some reduction in the frustrations the deaf child undoubtedly experiences in the educational process, resulting in beneficial cumulative effects. The teacher might experience fewer frustrations, too. The possibilities of teaching machines for use with the deaf need to be thoroughly explored. The techniques and technology are ready.

Recognizing the possibilities of using teaching machines with deaf children, the writer designed, constructed, and tested a mechanical teaching device for teaching word recognition to young deaf children.[5] It might be defined as a stimulus-response, multiple-choice, immediate reinforcement teaching machine.[4] Simply described, it was a drum upon which were fixed twelve 4- by 8-inch cards. The drum was housed in a box so that one card at a time was visible

through a glass window. On each card was a picture of an object, and to the right of the picture was a vertical, multiple-choice array of five words. To the right of the window were five holes, each on a horizontal line with one of the words on the card in view. By inserting a stylus into one of the holes, the operator could indicate a choice of the word in the array which he considered to be associated with the picture. If his choice was correct, the drum was electrically enervated, and the next card was brought into position for a similar performance. If an incorrect choice was made, nothing happened, and he could continue making responses until a correct choice was made. The consequential action of the drum was precisely contingent upon a correct response, thus, providing immediate reinforcement and strengthening the association between the picture and the proper word. The teaching material was arranged in an orderly sequence so that discriminative responses were produced in sufficiently large numbers and with adequately small increments of complexity to induce learning.

The investigation of the effectiveness of the machine as a teaching device was made in a study involving three phases:

1. A preliminary study with 39 first grade and 5 kindergarten children (normal) for the purpose of developing a proficient method of programming teaching material for presentation in the machine.
2. A pilot study with 2 five-and-a-half-year-old deaf children for the purpose of testing and refining a procedure for testing the teaching efficiency of the machine.
3. A major study designed to test the machine under experimental conditions.

The major study is reviewed briefly.

The subjects of the experimental study formed a class of 8 profoundly deaf children at the beginning primary level of the Oral Department of the Illinois School for the Deaf. Their ages ranged from 6 years 2 months to 7 years 6 months. They constituted a typical class, intellectually. The subjects worked at the machine for about five minutes a day for ten consecutive school days and were taught 15 nouns. A paper and pencil, multiple-choice test of the 15 nouns was given just prior to the beginning of the experimental teaching program to verify lack of knowledge of the words selected for teaching. The same test was repeated at the end of the teaching program to assess the amount of learning. It was given again two weeks later to determine retention. The results were as follows:

1. The pretest showed that the subjects were not familiar with the 15 nouns. The group mean was 4.12 words correct. Such a mean was not significantly different from the mean of 3.00 expected by chance. The scores ranged from 1 to 6 words correct.
2. The retest given at the end of the experimental teaching program yielded a group mean of 13.75 words correct. This rise in the group mean was highly significant. The range was 13 and 14 words correct.
3. The retention test, given two weeks later, yielded a group mean of 13.63 words correct, nearly perfect retention. The range was from 12 to 15 words correct.

These results, although derived from a small sample and a limited training program, are an indication of the possibilities of augmenting the teacher's work by means of teaching machines. Further work is being done to explore the limits of the multiple-choice technique developed in the study. Forms of language other than nouns can be taught and simple language concepts can be developed at the beginning reading level with deaf children. Number concepts and arithmetic combinations can be developed with the machine, also.

(*Continued on page 76*)

The Albany Hospital Conservation of Hearing Center

PRE-SCHOOL TRAINING PROGRAM

EDWARD W. IANDOLI
PAULINE WINKLER
LEWIS BARTON

THE Conservation of Hearing Center at Albany Hospital is not only concerned with the diagnosis of deafness, its cause and degree, but also with the rehabilitation of the patient. In the case of the school age child or adult, this task is not as complicated as it is with children ranging in age from six months to five years. As stated in the previous article of this series, the school age child is recommended for one or more of the following services, depending primarily upon the degree of deafness, age and intellectual potential: advantageous seating in the classroom, speechreading, speech correction and auditory training, hearing aid, conservation of hearing class or school for the deaf. Children fourteen years and older, as well as adults, are referred to the New York State Bureau of Vocational Rehabilitation in the New York State Education Department for aptitude testing, program planning, job training and finally job placement at the conclusion of educational and vocational training.

The child from birth to school age presents the greatest problem. Any time from six months to three years of age depending upon the alertness and experience of the parents, the child who fails to develop speech or respond to sound stimuli is referred by a private otologist, pediatrician or public health nurse. When hearing loss has been determined to be the cause of little or no speech, the child and parents are eligible for the pre-school training program.

Many parents of deaf children express the feeling that the most trying times are those which lie between the diagnosis of deafness and the beginning of training. From six months to five years of age is, without question, too long a period to wait until these children become eligible for conservation of hearing classes. In these formative years, the parents are confronted with a problem they know little about and with which they are untrained to cope. It is an established fact that a hearing deficit, if neglected, manifests itself not only in a personality problem, but also in child and parent frustrations. Therefore, early detection as well as proper training and guidance are of utmost importance.

Many schools for the deaf accept children at the age of three years on a residential basis. Some authorities feel, however, that three years is too early an age to separate the child from the parent. It was to close this gap, to take advantage of the maximum learning period for language development and to offer some help to the parents that the pre-school training program at the Albany Hospital Conservation of Hearing Center was first inaugurated eight

Dr. Iandoli is director of the Conservation of Hearing Center; Miss Winkler is Consulting Audiologist and Dr. Barton is assistant professor of otolarnygology at Albany Hospital Medical Center.

Part II of a three-part series. Part I appeared in the December **Volta Review.**

years ago. The aim of the program is to instruct and guide the child and his parents from the diagnosis of deafness through the formative years until the child reaches the age when formal instruction can be started. The program at no time separates the child and the parent. Parents are required to attend training sessions with their children for the prime purpose of observing lesson methodology and teaching techniques so that similar daily lessons can be carried out in the home. It is only on this basis that a child is accepted in the pre-school program.

The deaf child must be taught many things which hearing children learn automatically as a result of constant exposure to sound stimuli. The senses of sight and touch must be trained to compensate for and supplement faulty hearing. The training period is slow and tedious, often discouraging and frustrating, but progress in terms of general discipline, peer relationship, acceptance of amplification and language stimulation is for the most part quite favorable. All deaf children, regardless of the degree of hearing loss, are brought into the program and experience the same type of training. Of course, children with greater residuals of hearing develop speech patterns more rapidly.

Pre-school training at Albany Hospital Conservation of Hearing Center is divided into four categories: sense training; auditory training; speechreading or lipreading; and speech and language development. Each of these categories will be considered separately in the order in which they are introduced.

The first meeting is devoted to explaining to the parents, one or both accompanying the child, the physical set-up necessary for home teaching. A similar set-up is used in the Conservation of Hearing Center. It consists of a small child's table with two children's chairs facing each other. The table is placed in front of a window. The chair facing the window is used by the teacher or parent since the light must be on the teacher's face. The chair with back to the window is used by the child. The parent is shown samples of the types of materials needed for the first few lessons.

At the second meeting, the child has his first formal lesson. He is introduced to sound by a strong rhythm record on the auditory training unit. Initially, the sound stimuli is channeled through the speaker while the teacher and child clap in rhythm to music. Headpieces are next introduced and the speaker is shut off so that the music comes only through the earphones. Clapping is continued. The Albany Hospital Conservation of Hearing Center has available small desk model hearing aids with individual ear molds for home use. These instruments house loudness balance controls to compensate for measured differences between ears. Once the child has been introduced to amplified sound through the speaker and headpieces the desk model unit is adjusted to the child's practical threshold of hearing. The set is loaned to the parent for a period of time until the child is ready to use his own hearing instrument. It has been observed that exposure to sound stimuli on the desk model hearing aid for several weeks has often resulted in a gain on re-audiometric evaluation. This would imply that introduction and adjustment to sound stimuli lends itself to a more reliable threshold measurement.

The staff at the Center feels very strongly that individual aids should not be placed on children until they are able to recognize amplified sound and also begin to produce sound. Excessive amplification over too long a period of time has been known to bring about an antipathy to amplification and even to destroy what little hearing some children may have. For this reason, it is felt that amplification should be handled with extreme care and that the hearing aid should not be fitted to the child until the pure-tone audiogram is accurate.

The second formal lesson introduces sense training in the form of matching

colors. In succeeding lessons, the matching of objects of various sizes, shapes and colors is presented to coordinate the kinesthetic and visual senses. Picture matching and imitation of bodily movements follow. At succeeding lessons, the child is trained to imitate lip, teeth and tongue movements. By these steps the child progresses from recognition of gross similarities to the detection of minute differences. The main objective of this rationale is to promote a "carry-over" in terms of having the child discriminate between the various movements of the vocal organs to provide for good vowel and consonant production. Rhythm is a part of every lesson. Research has indicated that intelligibility of speech depends a great deal upon the rhythmic patterns.

When sense training and rhythm have become an integral part of each lesson, the auditory training begins. The child is taught to discriminate between sounds of various pitch. The next step involves vowel discrimination. Objects such as a *hat* and a *horn*, a *boot* and a *ball* are utilized to demonstrate this. The child is taught to discriminate between objects with similar consonant content but different vowel components. Later, the lips are covered and sound alone is presented. Speechreading is taught in conjunction with auditory training when words, phrases, short sentences and finally stories are incorporated into the lesson.

Once the child has learned to imitate bodily movements and facial expressions, lip and tongue exercises are added in order to develop the vocal musculature necessary for good speech production. Breath control exercises are also started. It is a matter of months and sometimes years before all this is accomplished. Usually, speech production begins with vowel imitation producing the animal sounds. Pictures and objects are used in play situations. The parents are advised to talk constantly to the child and encourage him to vocalize at random. It is emphasized that formal speech therapy can best be handled in the school environment when the child is at the age at which he will more readily benefit from this type of instruction.

The instruction of all children is started individually with their parents. As soon as the child is able, he and his parents join another child of approximately equal age and ability. As the children mature, other children and their parents are added to the group. This is done for two reasons. First, imitation and competition with other children produce more rapid learning. In addition, the parents are helped immeasurably by sharing experiences and problems with parents of other deaf children. All children are kept in training classes until they are of age to enter a regular class, conservation of hearing class or a school for the deaf, the choice depending upon their degree of deafness.

This, in brief, is the program for the pre-school deaf child at the Albany Hospital Conservation of Hearing Center. You will note that the parent is an integral part of the program. In spite of the parent-teacher-child learning situation, there was a need for more help to be offered to the parent than could be given in the pre-school training period. The next and last article of this series will discuss the parent education program which supplements the pre-school training.

ONE AT A TIME

A correspondence school for pre-school to primary deaf children and their parents.

Write

Margaret Whitsitt, M.A.
Box 239
Vacaville, California

Where Does Mike Belong?

PATRICE COSTELLO

LET me tell you about a little boy who is not only deaf, but a severely affected cerebral palsied child. He not only must learn to lipread—he must first teach his eyes to focus for gradually longer and longer periods. He not only must build a store of meaningful language, he must sort out all the factors in his environment and place them properly in his awakening understanding, before he can pick up the fuzzy white toy. (Is that fuzzy toy here in the foreground where I can hold it, or is it in the background—a picture on the wall?) He must not only learn to speak, he must first learn to hold a glass of water and drink, to bring a spoonful of food to his mouth, chew and swallow it.

You may now be thinking, "why is this child in a school for the deaf? He doesn't belong there. He can't walk, run, focus his eyes for very long or even chew. He's cerebral palsied. He's brain injured. *He doesn't belong in a school for the deaf!*" But he does. He's deaf.

If he were to be placed in a center designed for the rehabilitation of crippled children, he might make good use of the services in such departments as physical therapy and occupational therapy. He might in the former learn to walk in braces and crutches. In the latter to use those wayward hands that don't do the things he wants them to. In speech therapy, he might learn to drink better, to chew food he now merely swallows and eventually to say sounds and words. But if you said to the teacher in the education department of such a center: "Teach this child language through lipreading. Encourage him to

Special attention for Mike from Miss Ann Godfrey, a student teacher at Crotched Mountain School for the Deaf.

speak. Train his residual hearing. Teach him to read and write, then give him all the subject matter the other children receive," if you said this, the poor teacher's answer would likely be, "I can't teach a deaf child. I don't know how."

Many parents have had this experience. Their child can't be educated in a school for the deaf because he is badly crippled for any number of reasons, including cerebral palsy. Or he is turned away from the class or center devoted to the special training and education of the crippled because he is deaf. Why not, then, combine these special services? This has been done in a very few places. One is the Crotched Mountain School for the Deaf, in close association with the Crotched Mountain Rehabilitation Center. This is where Mike is beginning his education.

When parents of a deaf cerebral palsied child approach the director of the Crotched Mountain School for the Deaf for possible acceptance of their child, they often want to be assured that "everything will turn out all right in the end." But we know that this is the point at which the parent must be helped to accept realistic objectives. It is not possible to say immediately how much any child will eventually accomplish, and so it is with these multiple handicapped children. We can only say that we, as educators of the deaf, will do our best with the special help of the staff of the Crotched Mountain Rehabilitatiton Center to aid the child in reaching his highest potential.

What will it be for Mike? We don't know, but there are some indications. He has been evaluated by the staff of the Rehabilitation Center. Mike has been measured for and will soon be wearing braces, be put in a standing table, and attend nursery school with other deaf children. Now, without braces, he has been encouraged to take a wobbly step or two. Crutches may or may not be needed. The speech therapist notes some involuntary movements of the tongue, but believes speech is quite possible, after he learns to chew.

Both speech therapist and occupational therapist suggest he hold his own special cup, a cup having a top with a mouthpiece in which small holes are pierced. This way he will begin to develop some independence at mealtime. And there are other suggestions such as runners on the legs of Mike's high chair so that he won't topple himself, chair and all, onto the hard floor.

Miss Crew, his nursery school teacher, Mrs. Abbot, his special tutor, and Mrs. Tabor, his house mother; share in his care as well as his training. His family takes him home every other weekend.

There are the beginnings of improvement. Mike is noticing many things he ignored before. He is learning to enjoy certain toys. He loves to listen to amplified sound, especially music. He has started to eat some ground, rather than all strained, foods. He wants to walk and creep. He enjoys being with his classmates, although he is not yet truly one of the group. There are no true speech sounds yet, and no indication of lipreading, but he laughs louder, longer and more often than when he came to us, and tries something new nearly every day. We all hope for his continued improvement, just as we do for that of all our deaf children.

In addition to Crotched Mountain School for the Deaf, in Greenfield, N.H., the following schools and classes in the United States and Canada have reported that they accept deaf and cerebral palsied children. Most of them are preschool programs for children under six years of age, but a few of those listed take older children.

Arkansas School for the Deaf, Markham & Park, Little Rock, Ark.

King's County Deaf Class, 14th Avenue & Pima Street, Armona, Calif.

Anderson School, Class for the Deaf, 4110 West 154 Street, Lawndale, Calif.

Hyde Park Boulevard School, 3140 Hyde Park Boulevard, Los Angeles 43, Calif.

Driffill School, 910 South "E" Street, Oxnard, Calif.

(*Continued on page* 91)

Rochester Delegates to Visit Niagara Falls

A bus trip to the Niagara District is planned for Wednesday afternoon, June 29. The bus will go via the New York State Thruway to Niagara Falls, New York, over the Rainbow Bridge to the Canadian side. Here are thirty-five miles of scenic park area bordering the entire Niagara River frontier between Lake Erie and Lake Ontario—from Old Fort Erie opposite Buffalo to Fort Niagara and Niagara-on-the-Lake.

There are many points of interest along the way: the famous Brock Monument—a statue 185 feet high erected to the Canadian General who fought so valiantly in the War of 1812; The Upper Rapids, the Whirlpool Rapids with its Spanish Aero car; the "Maid of the Mist" which carries passengers through the boiling waters almost to the foot of the Falls; Oakes Garden Theater, and the Niagara Power Developments are a few of the wonders of the region. The Hydro Floral Clock, inspired by the original floral clock in Edinburgh, Scotland, is made up of 24,000 colorful plants. At the first frost the plants are lifted and those indicating the hands on the dial are replaced with stone chips of white limestone and pink granite. The twelve letters that make up "Ontario Hydro" are a unique feature of the clock face replacing the usual hour numerals.

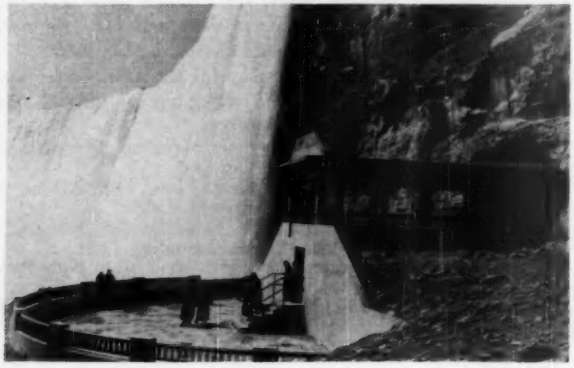
A buffet supper will be served at the Queenston Heights Restaurant, 340 feet above the Niagara River, overlooking the lower river and the fruit orchards of the famous Niagara Fruit Belt.

There will be ample time allowed for individual sight seeing and for visiting the interesting china, woolen and gift shops in the Princess Elizabeth Building.

The return trip will continue 20 miles south along the scenic boulevard to the Peace Bridge and Buffalo and by Thruway to Rochester.

A trip to the Speech and Hearing Center at the University of Syracuse, Syracuse, N. Y. will be made available Wednesday afternoon, June 29, for all those who might be interested. Included in this trip would be a stop-over at Newark, N. Y. to view the famous rose gardens.

Dr. Louis M. DiCarlo heads the Hearing and Speech Center which provides a rehabilitation program for deaf and hard of hearing children.



Horseshoe Falls from Table Rock observation plaza.

INTEGRATION—

A Look at the Total Picture

MARY K. VAN WYK

Miss Van Wyk, director of the Ft. Lauderdale Oral School (Florida), was formerly executive secretary of the Alexander Graham Bell Association for the Deaf. She gave the paper printed here at the 1959 convention of the American Speech and Hearing Association in Cleveland.

INTEGRATING the deaf child into a hearing world means more than just educational integration. Social and vocational integration are equally important in the total picture. Our ultimate goal for our deaf children is for them to live and to compete with hearing people in all three areas. Though we must be realistic and acknowledge that this is not attainable for all, it is for many.

As we view the total picture of the average deaf child's program, it usually follows this pattern:

Infancy to about three years. The only area that comes into the picture here is social integration. Most parents report no problems, though most, if not all, of the people with whom the child has contact have normal hearing. Parents may tend to discount the seriousness of the handicap at this level because the child is "just like the others."

Preschool, three to six years. On this level most of the children are segregated educationally. Because progress is more rapid in this period than any other, more children at this age are able to attend school as day students. Social contacts with hearing children continue for most of these children, and social integration is usually excellent. In instances where parents move to a new community to enroll their children, parents of deaf children band together, and the children's social contacts become restricted to deaf children much as they would be if the children were enrolled in a residential program.

School years. This period usually extends from age 5½ to approximately 20 years, and it is the period of greatest segregation. Almost complete segregation throughout these most important developmental years cannot help but affect the adjustment to a hearing world. In addition, most of our young deaf people are instructed in vocational training by methods that will not be used by their future employers.

Adult years. Upon completion of their formal education, the deaf are forced back into the hearing world for at least the working hours of each day. Their problems in adjustment will revolve around their inability to make a satisfactory adjustment to fellow workers or to their inability to communicate adequately with employers. At this level, some social integration is a must, but for the most part, the deaf choose their friends from their own group. In view of the communication problem, this is to be expected. Also many have had practically no opportunities for making friends among hearing people during their school years. Some do enter hearing schools for further education, but most stop their educational programs when they leave the segregated school.

To achieve more successful integration, steps should be taken to break down the almost complete segregation of deaf children from ages 5 to 20. Educational integration in a carefully

co-ordinated program is an important trend in this direction.

Children have to be educated, whenever possible, to a level acceptable within their socio-economic group. A bright deaf child can complete 12th grade at an age closer to that of hearing children if he is integrated during the elementary grades. The advantages are many. (1) Programs for hearing children are accelerated. The bright deaf child does not need the slower but more intensive program of the segregated class. (2) He has the advantage of a broader curriculum and the stimulation of the other children. (3) Since he receives less individual attention, he acquires more independent work habits. He learns to seek out his own information from his textbooks and from other reference and resource books. (4) The improvement in oral language is spectacular and is shown in a rapid growth of vocabulary. During the first year of integration I have found that language development and independent work habits are the most noted improvement. (5) He learns at an early age to compete with hearing children. He soon acquires an understanding of what is expected of most children his age.

At the appropriate time, vocational training is begun. If deaf children are enrolled in programs with hearing children, they are being given a more realistic approach to working in a hearing world. They learn to compete, during the learning process, with people who could be their co-workers later. They gain an insight into some of the problems they will face as wage earners, and will have a better understanding of the kind of competition they will have when they become employees. If they are given special privileges and consideration during the learning period, they will expect them later on.

When deaf children attend schools for the hearing, social integration is extremely important. In the formal classroom situation, the opportunities are few. In many programs of this nature, the deaf children eat and attend art and physical education with the hearing children, and that is the extent of the integration. To have children truly integrated socially, they should be participating in all types of activities appropriate to their age group. They should also be a part of their own neighborhood and be able to mix with relatives and children of family friends. We hear so often of the immaturity of deaf children. I have found that association with hearing children in social functions makes them more mature. We must be realistic and accept the fact that we will have problems, but we certainly can't avoid these problems by postponing them. It is much easier to achieve good social adjustment at 9 or 10 than at 13 and up. By then the problems have multiplied.

Many of the children are moved into hearing schools because they are unusually good students. Frequently they are leaders, not only in their classroom work, but in social activities as well. Often this leadership is not attainable in a school with hearing pupils. It is easier for these children to accept this fact when they are still in the pre-teenage group.

For an integrated program to be a success, certain factors are required. (1) The pupils should be integrated in a school where classes are small, at least while they are still on the elementary level. (2) They should be placed with teachers who look upon this as an opportunity for added service and a challenge. (3) There must be a special school to prepare and carry out a program of strong supportive help. The two programs must be carefully co-ordinated. (4) There should not be any integration attempted before speech and language skills are established. (5) All students should be carefully screened prior to admission to the program.

I sincerely feel we can achieve true integration for the children who have been prepared educationally, socially

(*Continued on page* 82)

DEAFNESS and EQUILIBRIUM

Response to a Questionnaire

RAYMOND MASSENGILL, JR., Knoxville, Tenn.

THE person who is deaf may have poor balance in certain cases. Culler[4] says that the semicircular canals give to the mind its sense of equilibrium or balance. Polyak[7] states that the vestibule, a part of the inner ear, is concerned in the maintenance of equilibrium and that the principal function of the vestibule is to act as a peripheral organ of equilibrium.

Daniels[5] states that a superintendent of a state school for the deaf reports that one of the common difficulties experienced by the boys in his school was the matter of balance.

PROCEDURE

In the present study questionnaires were sent out to fifteen basketball coaches of hearing basketball teams that had played against the Tennessee School for the Deaf. A total of seventy-two were filled out by varsity high school basketball players from fifteen hearing teams that had played against T.S.D. One of the questions on the questionnaires sent both to the hearing coaches and varsity basketball players of hearing teams was the following:

> *Have you noticed that the basketball players for the Tennessee School for the Deaf have trouble with their co-ordination?*

Twelve of the coaches of hearing teams answered this question in the affirmative and three in the negative. Forty-seven of the varsity basketball players answered this question in the affirmative and twenty-five gave a negative answer.

A very important aspect of a good basketball player is his ability to make a large percentage of his free throws. In order for the player to be able to make a large percentage of his free throws he has to have good balance. Anderson and Micolean[1] think good balance is important for good free throws and Bunn[2] believes that the body should be kept equally distributed and perfectly balanced while shooting a free throw.

In the present study of the basketball record T.S.D. had for the past five seasons it was found that the players for T.S.D. missed a larger percentage of their free throws than did their hearing opponents.

Bunn[3] states that an opponent with the basketball may be dribbling, shooting, passing, pivoting, or any of these movements, and that the player guarding him must be able to meet many situations. If a player has poor balance, it is hard for him to guard another player with good balance without fouling the player. In the present study of the T.S.D. basketball record for five seasons it was found that the players for T.S.D. committed more fouls than their hearing opponents.

In order to find whether the basketball players at T.S.D. for the 1958-1959 basketball season were physically as fit as hearing boys and to show that poor physical fitness might cause them not to function well in certain aspects of basketball, Hunsicker's[6] Ashper Youth Fitness Test was administered to the deaf players. The deaf players did well on this test and the results showed they were as physically fit as hearing boys their own age.

CONCLUSION

It appears that equilibrium plays an important role in a basketball player's ability to function well and that the deaf basketball players in this study show signs of poor balance in certain situations.

(*Continued on page* 93)

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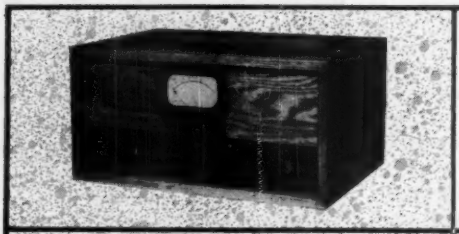

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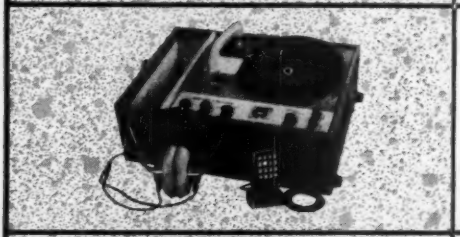

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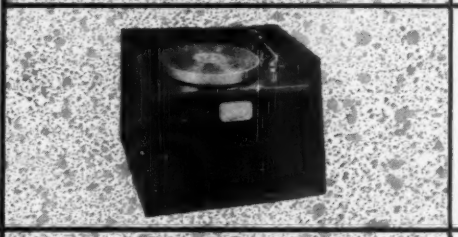

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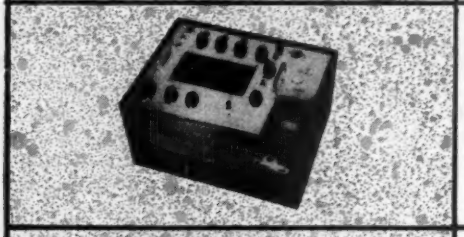

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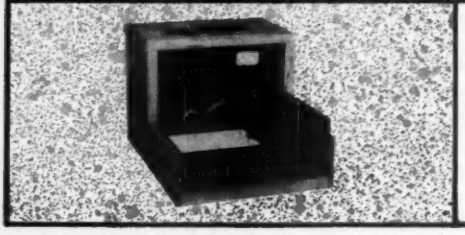

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el 162 speech audiometer

cal and other high-standard professional use and meets the applicable specifica-
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E664 psychogalvanometer

nometer, permits the application of new audiometric techniques. Audiograms
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E800 automatic audiometer

n auditory stimulus whose frequency is increased slowly and whose intensity is
constructed that the patient's adjustments are automatically recorded on the
aces his own audiogram. A flexible and valuable research audiometer.

m a s s a c h u s e t t s

Gifts to the Volta Bureau

THIS month we continue the listing of those who responded to our Christmas Appeal for funds. Many of our friends also took the opportunity to write notes with their gifts. The Association staff particularly appreciated the following letter from a little girl :

Dear Members of the Association for the Deaf,

I am a hard of hearing child myself and I go to the Lexington School for the Hard of Hearing here in New York City. I send you part of my Christmas allowance and congratulate you all in the good work and welfare of the deaf.

Yours truly,
Blanch

A

Mr. and Mrs. Harry Altschul, Mr. and Mrs. Edward C. Anderson, R. T. Arrington, Mrs. Frances Aspengren, Charles Atkinson, Ruby Augustine.

B

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(*Continued from page 62*)

The results point to the possibilities of Skinner's machine and techniques for older deaf children who have acquired a degree of reading skill. Research is needed to explore this broader area of use of teaching machines with the deaf. It is reasonable to postulate that teaching machines may help achieve the break-through of the language barrier.

SUMMARY

1. It is proposed that teaching machines hold promising possibilities for the deaf as a means of increasing teaching efficiency by relieving the teacher of some of the tedium of drill and by engaging pupils in self-oriented activities at times when the teacher is occupied with other pupils of the class. Properly used, an appropriate machine can be a more effective teacher than a human being for certain kinds of drill. A break-through of the language barrier is a reasonable hope. Deaf children might benefit emotionally as well as educationally because of the increased opportunity to work independently.

2. An electrically enervated, stimulus-response, multiple-choice, immediate reinforcement device was designed, constructed, and tested to explore the possibilities of using a machine to teach word recognition to young deaf children. Eight subjects learned 13.75 nouns in about 50 minutes, spending only five minutes a day at the machine for ten consecutive school days. Retention after two weeks was nearly perfect.

3. Further work is being done to develop programs for teaching vocabulary other than nouns and to explore the limits of teaching language concepts by the multiple-choice technique employed with the experimental teaching machine. It is suggested that Skinner's techniques should be investigated for use with older deaf children who can read.

1. Pressey, Sidney L., "A Machine for Automatic Teaching of Drill Material," *School and Society*, Vol. 25, 1927, p. 549-552.
2. Skinner, B. F., "Teaching Machines," *Science*, Vol. 128, 1958, p. 969-977.
3. Skinner, B. F., "The Science of Learning and the Art of Teaching," *Harvard Educational Review*, Vol. 24, 1954, p. 86-97.
4. Porter, Douglas, "A Critical Review of a Portion of the Literature on Teaching Devices," *Harvard Educational Review*, Vol. 27, 1957, p. 126-147.
5. Falconer, George A., "A Mechanical Device for Teaching Word Recognition to Young Deaf Children," 1959, a thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education in the Graduate College of the University of Illinois.

BOOK NOTES & REVIEWS

Speech Development, Improvement, and Correction, by Lucile Cypreansen, John H. Wiley and Leroy T. Laase, New York, The Ronald Press Co., 1959. 353 pages, $5.00.

Without emphasizing the use of fancy materials and unnecessary technical terminology, the authors of this book have succeeded in their purpose of writing a practical text for beginning courses in speech correction methods in the elementary schools and for students preparing to become speech therapists. They have made use of existing published materials as well as of results of their own research in speech and hearing laboratories, preschools and demonstration schools.

Throughout the book there is consistent awareness of the child as an individual rather than as a rote mechanical being and of speech as the instrument of communication. The very definition of a speech defect, "when attention is called to *how* a child is speaking rather than to *what* he is saying," further emphasizes this point of view.

With this in mind, the authors have arranged their discussion in three major sections: the first dealing with speech development, deviations, training and retraining; the second with records and testing materials; the third with methods and graded materials.

Emphasis is placed on the importance of complete diagnostic procedures (by qualified and ethical professional personnel) with referrals as indicated to any one or combination of other professions and/or disciplines, after which recommendations for remedial procedures may be made. The authors caution against easy solutions and 'pat' diagnoses and show no reluctance in disagreeing with rather commonly accepted philosophies which they feel are not consistent with current findings in child psychology.

A brief section, devoted to children with hearing losses, should be of value to the classroom teacher and speech therapist in giving insight into general problems with which these children are faced and in prescribing certain remedial measures. Some further references are given in the appendix of the book, but no intensive study is attempted. Little mention is made of children with severe hearing losses except to say that they are usually educated in day or residential schools for the deaf.

Following the discussion of each broad category of speech defect (which they are careful to label "The *Child* With . . . " Articulatory Problems, a Voice Defect, a Hearing Loss, Cerebral Palsy, a Cleft Palate, Delayed Speech or Speech Retardation; "The *Child* Who Stutters") there is a short general, but practical, discussion devoted to ways in which parents may help their children.

Teachers of the deaf will be interested not only in the beginning discussion, but in parts of the picture test and methods of recording, the teaching of the production of individual speech sounds and in the speech games—all of which are found in the second and third sections of the book. Being discriminative in choosing materials to meet the individual and group needs of her particular children, the teacher of deaf children will find many helpful suggestions.—*Eleanor Vorce, Principal, Lexington School for the Deaf, N. Y. C.*

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Lipreading for the Deaf and the Hard of Hearing, a sourcebook report by the Lipreading Committee of Junior High School 47, Manhattan. Order from: The Board of Education of the City of New York, 110 Livingston Street, Brooklyn 1, N. Y. 1959, 103 pages, paper 75¢.

This sourcebook was developed for use in Junior High School 47, the New York City public school for deaf and hard of hearing children. It has been reproduced, not only for use by teachers on its own staff, but also for those teaching lipreading to special groups elsewhere.

In Part I, General Lipreading, we find fundamental principles and basic approaches for the beginning phases of lipreading instruction. Many valuable suggestions are included such as:

1. The correlation between lipreading and a child's language development.

2. The importance of stimulating meaningful and pleasing material centering around the child's activities.

3. A sound philosophy related to daily techniques.

4. The expected responses of various types of children being taught.

5. Suggested techniques, activities and procedures in the teaching of lipreading; the goal being to establish an awareness that the lips are an avenue of communication, and that words are symbols of meaning, significant and important to the child.

6. A source list of practical and effective teaching devices.

Part II, Sequential Development of Lipreading, is a series of formal lessons graded to develop the art of lipreading. Its master plan is to meet the needs of both the deaf and hard of hearing child. It does not propose to replace the various methods used in teaching in this field, but rather to supply material adapted to the language needs of the children being taught.

Much of the material was selected,

methods of research, not only as they apply to the field of speech correction and hearing, but as they might be used in public address, fundamentals of speech ,interpretation, theatre, etc.

Also in the book are chapters concerning the field of speech, bibliographical resources, as well as professional writing.

To the student in hearing and speech who is anticipating writing a thesis or dissertation this book should be of great help in preparing for the task.—*June Miller, Educational Director, Hearing and Speech Department, University of Kansas Medical Center, Kansas City, Kansas.*

Attempt at Explanation of Directional Hearing on the Basis of Very Fine Time-Difference Registration, by Joseph Matzker. Chicago: The Beltone Institute for Hearing Research, 1959. 16 pages, paper.

Twelfth in the Beltone translation series, this article first appeared in *Acta Oto-Laryngologica* Vol. 49/6.

***Survey of Employers' Practices and Policies in the Hiring of Physically Impaired Workers*, Robert Rau, chrmn. New York: Federation Employment and Guidance Service, 1959. 133 pages, paper.**

DIGEST OF PERIODICALS

***Exceptional Children*, 1201 - 16th St., N.W., Washington 6.**

October, 1959

"Some Problems Confronting Children with Deafness," by D. Robert Frisina, director of the Hearing and Speech Center at Gallaudet College, is an article concerned with necessity for the deaf child to transpose auditory verbal symbols into visual verbal symbols. Since hearing is the primary factor in the development of language in children, this slows down the deaf child's progress, and is reflected in his emotional and physical growth. The development in abstract reasoning is particularly serious, and the author feels that

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devised and adapted by the staff of P. S. 47, but other source lists have been selected when deemed applicable to the needs of the program.

Several pages preceding the regular lesson or layouts are devoted to an introduction and detailed description of the basic steps in the lesson, each type of material used is carefully explained, and procedures included. These directions should prove most helpful to teachers.

An experienced teacher can glean many helpful suggestions from the majority of teaching manuals published, and in most of these bulletins will also appear statements worthy of debate. Here are a few which attracted the reviewer's attention.

1. Do we only watch the movements of the lips and facial expressions in lipreading?

2. Does the use of a full voice in teaching lipreading produce the best results?

3. Are homophenes made a part of lipreading study only when one such word appears in context?

4. Can the words "map," "mat," and "mad" be considered homophenous? The final p in map is a visible movement formed with lips shut and opened. The final t & d in mat and mad are invisible movements formed with the tip of the tongue behind the upper teeth—*Frances Harrod Downes, audiologist and lipreading instructor, Washington, D. C.*

An Introduction to Research in Speech, by J. Jeffery Auer, New York: Harper and Brothers, 1959. 244 pages, $5.00.

This book is an introduction to research methods for the student in the field of hearing and speech. It discusses and gives excellent examples of the historical, descriptive and experimental

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some means should be developed to convey abstract concepts to hearing impaired youngsters.

***Journal of Speech and Hearing Disorders*, 1001 Connecticut Ave., N.W., Washington 6.**

November, 1959

"Importance of Individual Hearing Aids and Early Therapy for Preschool Children," by Adam J. Sortini, is based on a study made by the Hearing and Speech Clinic of Children's Medical Center in Boston. One group used in the study was made up of 25 children, between the ages of six and twelve, who were pupils in several schools for the deaf in Massachusetts. They had not previously worn hearing aids, although their losses ranged from 62-95 db. The other group was made up of 60 preschool children, between the ages of six months and three years, whose losses were from 57-92 db. throughout the critical speech range. The study was conducted over a three year period, with results indicating that preschool children of normal intelligence obtain the maximum benefit from wearing a hearing aid if fitted with an individual aid as soon as possible after the hearing loss is diagnosed. Behavior and personality development, as well as language development, are affected.

"An Experimental Apparatus for Testing Preschool Children," by Edgar L. Lowell, Newton S. Metfessel and Alexander W. McEachern of the John Tracy Clinic, describes an experimental apparatus developed at the clinic to supplement the standardized tests for preschool children. The objective is to secure and maintain sufficient motivation, interest and purpose in the young subjects.

"Role of Conditioning In GSR Audiometry with Children," William W. Grings, Edgar L. Lowell and Georgina

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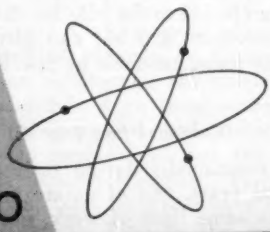

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